

## *Cuscuta* subgenus *Cuscuta* (Convolvulaceae) in Ethiopia, with the description of a new species

Miguel A. García

García, M. A., Real Jardín Botánico, CSIC, Pl. de Murillo 2, E-28014, Madrid, Spain

Received 9 April 1999, accepted 21 June 1999

García, M. A. 1999: *Cuscuta* subgenus *Cuscuta* (Convolvulaceae) in Ethiopia, with the description of a new species. — *Ann. Bot. Fennici* 36: 165–170.

As a result of a worldwide taxonomic revision of *Cuscuta* L. subgenus *Cuscuta*, *C. castroviejoi* M.A. García is described as a new species endemic to Ethiopia. The taxonomic status of some little known African species of the subgenus that appear in Ethiopia is discussed. Two previously recognized species of the subgenus, *C. approximata* Bab. and *C. pedicellata* Ledeb., are excluded for the country while *C. pretoriana* Yunck. and *C. somaliensis* Yunck. are recorded for the first time. A key to the species of the subgenus in Ethiopia is provided.

Key words: Convolvulaceae, *Cuscuta*, Ethiopia, new species, taxonomy

*Cuscuta* L. is a genus of approximately 150 species of twining holoparasitic plants, most of them from temperate zones throughout the world (Yuncker 1932). Subgenus *Cuscuta* is comprised of ca. 25 species native for the Old World, with some species naturalized in America and Oceania. In the course of the preparation of a world-wide taxonomic revision of the subgenus, I studied more than 5 500 sheets from approximately 40 herbaria, and found that one species, endemic to Ethiopia, was still undescribed. Moreover, two species have never been cited for the country and others should be excluded from the Ethiopian flora.

In the checklist prepared by Cufodontis (1961), 10 species of *Cuscuta* are recorded for Ethiopia, Eritrea and Northern Somalia. Four of them, *C. approximata* Bab., *C. pedicellata* Ledeb., *C. planiflora* Ten. and *C. somaliensis* Yunck. belong in *Cuscuta* subgenus *Cuscuta*, characterized by the

presence of two free styles and botuliform to subulate stigmas.

*Cuscuta approximata* is mostly an Euroasiatic taxon with populations in NW Africa, characterized by the mucronate and obovate calyx lobes, which are broadly overlapping and shiny-reticulate when dry. The former Ethiopian record of this species was a specimen of *C. abyssinica* A. Rich., collected by Quartin-Dillon and Petit and misidentified by Yuncker (1932) as *C. approximata* var. *urceolata* (Kunze) Yunck. (see Cufodontis 1961).

*Cuscuta pedicellata* is mainly an Asiatic species with African populations along the Nile Valley in Egypt and Sudan. It is characterized by the small, subglobose and pedicellate flowers with triangular calyx and corolla lobes, absent or very short and conical styles, and the fruit exerted from the corolla tube. Baker and Rendle (1906) identified some collections from Eritrea and Ethiopia

as *C. arabica* Fresen., a synonym of *C. pedicellata*. I have not studied these collections, but the absence of additional material compels me to consider it a doubtful record for the country.

According to the material studied, the Ethiopian species of *Cuscuta* subgenus *Cuscuta* can be separated by the following key:

1. Flowers densely papillate ..... *C. somaliensis*
1. Flowers smooth or sparsely papillate ..... 2
2. Corolla lobes 2.2–2.9 mm long; calyx lobes broadly overlapping with an acute subapical projection; staminal filaments more than 0.9 mm long ..... *C. castroviejoii*
2. Corolla lobes up to 1.8 mm long; calyx lobes free or scarcely overlapping, blunt or mucronate but without a subapical projection; staminal filaments up to 0.7 mm long ..... 3
3. Calyx lobes fleshy at the tips; corolla lobes spreading in fruit, blunt or acute and thickened at the apex ..... *C. planiflora*
3. Calyx lobes membranous or fleshy at the back, not at the tips; corolla lobes upright to erect-spreading in fruit, acute or subulate, not thickened at the apex ..... 4
4. Stamens 0.4–0.7 mm long; corolla scales 0.7–1.0 mm long, rather inconspicuous ..... *C. pretoriana*
4. Stamens 0.7–1.5 mm long; corolla scales 1.2–2.2 mm long, well developed ..... *C. abyssinica*

### *Cuscuta abyssinica* A. Rich.

Tent. Fl. Abyss. 2: 78. 1850. — *C. planiflora* Ten. var. *abyssinica* (A. Rich.) Verd., Kew Bull. 12: 337. 1957. — Type: Ethiopia. “Crescit parasitica in Lantana familia Verbenacearum, in locis humidis convallis fluvius Tarasse manse Augusto florens”, *Quartin-Dillon & Petit 181* (lectotype MO!, designated by Yuncker 1932; isolectotypes BR!, P).

*Cuscuta abyssinica* f. *breviloba* Yunck., Mem. Torrey Bot. Club 18: 288. 1932. — Type: Ethiopia. (MO?, not seen)

*Cuscuta abyssinica* f. *membranacea* Yunck., Mem. Torrey Bot. Club 18: 288. 1932. — Type: Ethiopia. 10.XI.1863 *Schimper 1344* (lectotype BM!, here designated; isolectotype B!).

Although this species has been recognized as a variety of *Cuscuta planiflora* by Cufodontis (1961), Verdcourt (1963), Gonçalves (1987) and other authors of the genus for African Floras, Engelman (1859) and Yuncker (1932) previously considered the specific rank. There are several morphological characters that, in my opinion, support the specific treatment for *C. abyssinica*: corolla lobes acute or subulate, not thickened at the tips and erect in fruit; calyx lobes membranous

and reticulate when dry; styles and stigmas long and narrow, sometimes capillary, much longer than the ovary; corolla scales well developed and frequently bifid; flowers frequently on short, obconic pedicels.

*Specimens examined.* — **Ethiopia** (Eritrea included). Shakbado, Illubabor, 7°46'N, 35°13'E, 2 100 m, 1960 *H.F. Mooney 8793* (K). Ghinda, 1916 *I. Baldrati 960* (FT). Addis Abeba, 9°03'N, 38°42'E, 1937 *G. Pionani 364* (FT). Addis Abeba al km. 13 della strada per Lechenti, 9°03'N, 38°42'E, 1937 *without collector* (FT). Amasen, Asmara, 15°20'N, 38°58'E, 2 300 m, 1902 *A. Pappi 2245* (FT). Harar Prov., Mount Kondudu, just below the summit, 9°26'N, 42°21'E, 2 760 m, 1969 *J.J.F.E. De Wilde 5888* (BR, MO). Kaffa Prov., 15 km W of Bonga along the road to Shewa Ghiminira, 7°15'N, 36°05'E, 1 950 m, 1973 *I. Friis et al. 2259* (BR, K). Chiré, bords du Taccazzé, 14°10'N, 38°03'N, 1840 *R. Quartin-Dillon & A. Petit 181* (BR, MO). Abissinien, Habâb, 1872 *J.M. Hildebrant 506* (B, BM, LE, W). Am Strand des Tana dels Messraha, 12°00'N, 37°45'E, 2 200 m, 1863 *G.H.W. Schimper 1344* (B, BM).

### *Cuscuta planiflora* Ten.

Fl. Napol. 3: 250, pl. 220 fig. 3. 1824–29. — Type: Italy. “Luogo natale, ec. L’ho trovata attaccata alla Plantago lanceolata”, *Tenore s.n.* (lectotype MO!, designated by Yuncker 1932; isolectotype NAP!, photograph).

*Cuscuta brevistyla* A. Braun ex A. Rich, Tent. Fl. Abyss. 2: 79. 1850. — Type: Ethiopia. “Crescit in montosis prope Axum”, 26.XI.1842, *Schimper 1486* (lectotype G!, designated by Yuncker 1932; isolectotypes BM!, K!).

This is one of the most variable species in the genus. The common features in all these forms are the fleshy calyx lobes especially at the tips that are as long as or longer than the corolla tube; spreading corolla lobes that are ovate or triangular-ovate with the tips more or less fleshy; corolla scales variable in shape, but always present and developed.

*Cuscuta brevistyla* was described by Richard (1850) from plants collected by Schimper in 1842 near Axum. This species is described in many local floras as having styles plus stigmas shorter than the ovary. However, this character appears to vary in the type material, and the other morphological characters indicate that it is similar to *C. planiflora*.

*Specimens examined.* — **Ethiopia**. (Eritrea included): Between Debra Sina and Debra Berhan, near Mussolini Pass, 10°12'N, 38°46'E, 3 000 m, 1966 *W.J.J.O De Wilde & B.E.E. De Wilde 9632* (BR, K, MO). Shoa Province 40 km

along Dessie road from Addis Abeba, Saraè. Gaza Gobó, 1 900 m, 1902 A. Pappi 136 (FT). Shoa plateau, 9°20'N, 39°21' E, 2 575 m, 1970 J.W. Ash 361 (FT, K). Abyssinie, without locality, 1853 G.H.W. Schimper 14 (K, MO). Begemder, Vanka Ber, 11°40'N, 38°5'E, 2 100 m, 1863 G.H.W. Schimper 1120 (BM, K). Doka-Keit, 13°31'N, 35°46'E, 1841 J.R. Roth 426 (K). Arussi Prov., Chilalo awraja, near Sagure, ca. 30 km S of Asella, 7°58'N, 39°04'E, 2 500 m, 1971 M. Thullin 1610 (K). Shewa, Mt. Fure, SW of Addis Abeba, 2 600 m, 1974 M.G. Gilbert 3485 (K). In montanis prope Axum, 14°08'N, 38°43'E, 1842 G.H.W. Schimper 1486 (BM, G, K). Pass South of the summit of Gara Mullata Mountain, above Ascabni, 9°14'N, 41°47'E, 2 850 m, 1969 J.J.F.E. De Wilde 5069 (BR, PRE). Carnescin, Monte Anagulle, 2 600 m, 1924 A. Pappi 47 (FT). Amhara-Semien, Nulkefit, 1909 E. Chiovenda 3142 (FT). Mussolini Pass, between Debre Berham and Debre Sina, about 200 km NNE of Addis Abeba, 2 900 m, 1965 W.J.J.O. De Wilde & B.E.E. De Wilde 7401 (BR, MO). Tossa mountain, 1 km W of Desse, 11°7'N, 39°37'E, 2 700 m, 1969 J. Sutherland 227 (MO, UPS). Shewa, ca. 5 km before Gorebela (Ankober), 9°35'N, 39°42'E, 3 000 m, 1982 S. Edwards 49 (UPS). Asmara, 15°15'N, 38°50'E, 1892 G. Schweinfurth & D. Riva 2092 (K). W slope of Mt. Chilalo, Arussi, 7°24'N, 39°22'E, 1953 H.F. Mooney 5181 (K).

### *Cuscuta pretoriana* Yunck.

Brittonia 9: 133, fig. 2a–d. 1957. — Type: South Africa. “Near Pretoria, South Africa, in shade”, 6.V.1928 C.E. Moss 16852 (holotype BM!).

Yuncker (1957a) described *Cuscuta pretoriana* from a specimen collected in 1928 near Pretoria by C. E. Moss, and deposited at BM. The study of the type material revealed that it corresponds with the plants identified as *C. planiflora* var. *planiflora* or *C. planiflora* var. *mossamedensis* Hiern in some African Floras. However, the examination of several hundred specimens of *C. planiflora* from throughout its range indicates that there are enough differential characters to consider *C. pretoriana* a different species from *C. planiflora*. It can be distinguished by its small, subglobose flowers in few flowered glomerules; calyx tube very short or almost absent; calyx lobes that cover the corolla tube, very fleshy at the back but never at the tips and almost circular in cross section; corolla lobes triangular, acute, short (less than 1 mm), that cover the upper part of the thin and reticulate fruit; and corolla scales much reduced and adpressed to the corolla tube, with clavate processes.

*Cuscuta pretoriana* is most common in Tropical East Africa, but only one specimen from Ethiopia was studied by me.

*Specimen examined.* — **Ethiopia.** Bale, 13 km S of Welmel River, 37 km from Dello Mena (Maslo) on road to Bidre and Negele Boreana, 6°5'N, 39°40'E, 1 270 m, 1988 M.G. Gilbert & S. Demissew 8579 (K).

### *Cuscuta somaliensis* Yunck.

Mem. Torrey Bot. Club 18: 291, fig. 155. 1932. — Type: Somalia. “Africa: Somaliland”, Ruspoli & Riva 525 (holotype B!).

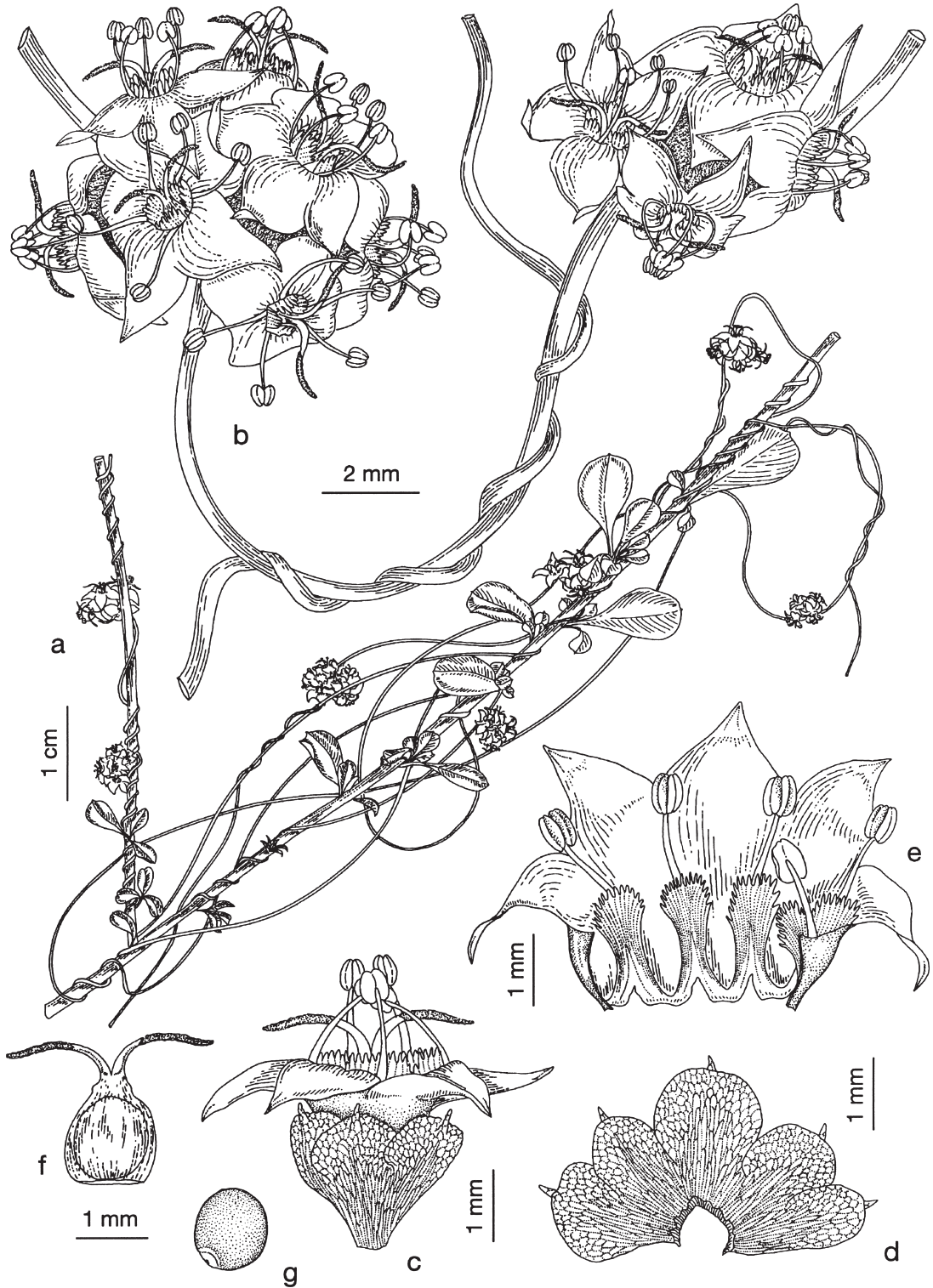
*Cuscuta abyssinica* A. Rich. var. *ghindensis* Yunck., Mem. Torrey Bot. Club 18: 288. 1932. — Type: Ethiopia. “Abyssinia: Ghinda, alt. 950 meters, on Ocimum”, 1891 Schweinfurth 428 (holotype B!).

This species was described by Yuncker (1932) from a specimen collected by C. E. Ruspoli and D. Riva in Somalia, and deposited at B. Although it has been considered that the holotype was destroyed, Yuncker often took fragments of material from different herbaria. Thus, part of the holotype of *Cuscuta somaliensis* was recently returned from NY to B. Examination of this material revealed that it corresponds to variety “A” of *C. planiflora* that Verdcourt (1963) refrained from naming in the Flora of Tropical East Africa. According to the material studied, it is a species widespread in East Africa, including Ethiopia.

*Specimens examined.* — **Ethiopia.** Harar Province, Mt. Hachin SW of Harar, 9°16'N, 42°7'E, 2 200 m, 1969 M.G. Gilbert & S.B. Gilbert 1433 (K). Gapra Valley, 9°21'N, 42°13'E, 1 600 m, 1933 J.B. Gillett 5074 (K). 12 km of Meki, 8°10'N, 38°50'E, 1972 M.G. Gilbert et al. 2494 (K). Maragus, Cohait, 1 700 m, 1902 A. Pappi 1035 (FT). Sidamo Prov., about 46 km SE of Kebré Mengist along the road to Neghelli, then 12 km W on the road, Awata river, 5°45'N, 39°16'E, 1 600 m, 1970 J.J.F.E. De Wilde 6633 (BR). Sidamo Prov., 20 km NW of Neghelli, along the road to Kebré Mengist, about 29 along a track to E, close to Ganale Doria r., 5°35'N, 39°40'E, 1 170 m, 1970 J.J.F.E. De Wilde 6653 (MO). Abyssinia, Ghinda, 14°10'N, 38°20'E, 950 m, 1891 G. Schweinfurth 428 (B).

### *Cuscuta castroviejoi* M.A. García, sp. nov. (Fig. 1)

*Flores pentameri, sessiles, dense glomerulati. Calyx campanulatus atque tubo corollae brevior, lobulis imbricatis, siccis reticulatis et splendidibus,*



**Fig. 1.** *Cuscuta castroviejoi* M. A. García (from *De Wilde 5114*). — a: Habit of the plant. — b: Detail of stems and inflorescences. — c: Flower. — d: Open calyx. — e: Open corolla showing petals, stamens and corolla scales. — f: Fruit. — g: Seed.

*acumine subapicali praeditis. Corolla tubularis, lobulis latis tuboque longioribus, acutis vel etiam subulatis. Squamae hypostaminales amplae, corollae tubo longiores aut aequilongae, supra ovarium convergentes, fimbriatae. Styli validi, saturate purpurei, a basi gradatim divergentes.*

Type: Ethiopia. Jerrer Valley, 15–25 km SSE of Jijiga, 1 500 m, 29.X.1976 L. Boulos 10430 (holotype K).

This species is dedicated to Prof. Santiago Castroviejo, director of my Ph.D. dissertation and principal researcher of the *Flora iberica* project.

Stems 0.2–0.8 mm in diameter, reddish, scarcely branched, smooth. Bracts 1.3–2.5 × 0.9–1.8 mm, ovate or broadly ovate, acute, with entire margins. Inflorescences in compact glomerules, 5–10 mm in diameter, with 3–10 flowers. Flowers pentamerous, sessile or very shortly pedicellate. Calyx obconic to campanulate, as long as or shorter than the corolla tube, yellowish, shiny and reticulate when dry; calyx lobes 1.1–1.9 × 0.9–2.0 mm, broadly elliptic, broadly obovate or suborbicular, obtuse or mucronate, with entire margin, somewhat keeled, imbricate, erect, with an acute, subapical and subconic projection up to 0.7 mm long; calyx tube 0.5–1.0 mm, shorter than the lobes. Corolla tubular in anthesis to urceolate in fruit, smooth, whitish to reddish; corolla lobes 2.2–2.9 × 1.2–2.3 mm, ovate, ovate-lanceolate or triangular, acute to subulate, sometimes slightly keeled, with entire margin, free or somewhat imbricate at the base, erect to deflexed, with long glandular cells; corolla tube 1.5–2.2 mm long, shorter than the lobes. Stamens 1.5–2.0 mm long, shorter than the corolla lobes; anthers 0.5–0.8 × 0.4–0.5 mm, oblong, yellowish; filaments 0.9–1.5 mm long, subulate, longer than the anthers. Corolla scales 1.5–2.3 × 0.4–1.0 mm, obovate or oblong, obtuse, well developed and convergent over the ovary, as long as or longer than the corolla tube, exerted, fimbriate. Styles 0.7–1.3 mm long, subcylindric or three-cornered and sometimes flattened at the base, frequently divergent towards the apex and purple; stigmas 0.5–2.0 mm long, subulate or subcylindric and sometimes somewhat flattened, reddish or yellowish, as long as or longer than the styles; styles and stigmas together longer than the ovary. Fruit 0.9–1.5 × 1.4–1.5 mm, a subglobose or ovoid circumscissile capsule with one subglobose or ovoid seed 1.0–1.3 × 1.0–1.2 mm.

This species is well characterized by the fol-

lowing features: shape of calyx lobes, broad and imbricate with a subapical acute projection; corolla tube shorter than the large and acute to subulate lobes; corolla scales well developed and convergent over the ovary, exerted and longer than the corolla tube; staminal filaments long and narrow; robust, frequently purple styles sometimes three-cornered and commonly divergent toward the apex; and fruit regularly dehiscent with only one ripe seed. All of these characters make this species easy to distinguish from the other species of the subgenus.

The shape of the calyx of *Cuscuta castroviejoii* resembles that of *C. rhodesiana* Yunck. (Yuncker 1957b). However, there are enough differential characters, apart from the geographical distribution, so as to prevent a possible confusion of these two species, such as the length of the corolla lobes and the form of the gynoecium. According to the material studied, *C. rhodesiana* is known only from Zambia, Tanzania and SE Kenya. Specimens of this species have been identified as *C. planiflora* var. *approximata* (Bab.) Engelm. by Verdcourt (1963) and Gonçalves (1987).

Among all the species collected in Ethiopia, *Cuscuta abyssinica* is the most similar to *C. castroviejoii*, but differs in the shape and size of the calyx and the corolla lobes, as well as in the thin and thread-like styles with a clear interstylar aperture.

*Additional material examined (paratypes).* — **Ethiopia.** Sidamo Prov., 98 km along the road from Neghelli to Filtu, 5°13'N, 40°28'E, 1 300 m, 17.VII.1970 J.J.F.E. De Wilde 6669 (BR, MO). Harrar Prov., 13 km W of Jijiga, along the road to Harrar, 9°22'N, 42°43'E, 1 800 m, 25.IV.1970 J.J.F.E. De Wilde 6478 (BR, MO). About 90 km along the road from Harar to Jijiga, 9°22'N, 42°43'E, 1 800 m, 6.VI.1969 J.J.F.E. De Wilde 5114 (BR, MO).

*Acknowledgements:* I thank the curators of the herbaria B, BM, BR, FT, G, K, LE, MO, NAP, PRE, UPS and W, for the loan of specimens and the curators of B, K and LE for the facilities during my visits to the herbaria; Juan Castillo for the drawings, Manuel Laínz for the Latin diagnosis and Santiago Castroviejo for his critical remarks. This work was supported by the *Flora iberica* project, with number PB96-0849 of the Spanish D.G.E.S.

## REFERENCES

Baker, J. G. & Rendle, A. B. 1906: *Cuscuta*. — In: Thiselton-Dyer, W. T. (ed.), *Flora of Tropical Africa* 4(2): 202–

206. Lovell Reeve & Co., London.
- Cufodontis, G. 1961: *Cuscuta*. Enumeratio Plantarum Aethiopiae Spermatophyta. — *Bull. Jard. Bot. État.* 31, Suppl.: 726–729.
- Gonçalves, M. L. 1987: Cuscutaceae. — In: Laurent, E. (ed.), *Flora Zambesiaca* 8(1): 130–135. Flora Zambesica Managing Committee, London.
- Richard, A. 1850: *Cuscuta*. — In: *Tentatem Florae Abyssinicae* 2: 78–79. Arthus Bertrand, Parisiis.
- Verdcourt, B. 1963: Convolvulaceae. — In: Hubbard, C. E. & Milne-Redhead, E. (eds.), *Flora of tropical East Africa*: 1–161. Crown Agents for Overseas Governments and Administrations, London.
- Yuncker, T. G. 1932: The genus *Cuscuta*. — *Mem. Torrey Bot. Club* 18: 109–331.
- Yuncker, T. G. 1957a: Three new species of *Cuscuta* from Africa and one new variety from Nepal. — *Brittonia* 9: 133–135
- Yuncker, T. G. 1957b: A new *Cuscuta* from South Africa. — *Bull. Torrey Bot. Club* 84: 429–430.